

STOCK MARKET PREDICTION WITH PYTHON

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ABSTRACT

This research paper explores the use of the Python programming language in analyzing the stock market. The paper explains the various techniques used in the analysis of the stock market and their limitations. It outlines the various features and capabilities of Python that make it suitable for stock market data analysis. It describes the characteristics of the stock market, such as trends, fluctuations, and volatility, and how Python can be used to interpret them. Further, it discusses various Python packages and libraries, including NumPy, Pandas, and Matplotlib, that are commonly used in stock market analysis. In addition, it examines several practical examples of Python applications in stock market analysis, including sentiment analysis, backtesting trading strategies, and portfolio optimization. The paper concludes by highlighting the potential of Python for advanced stock market analysis and the need for further research to enhance the tool's functionalities in this regard. Overall, this research paper demonstrates how Python can extract insights from stock market data efficiently and effectively.

I. INTRODUCTION

The stock market, also known as the equity market, is the most complex and unpredictable financial market. A stock market is a platform where sellers and buyers together trade stocks, shares, etc. The fluctuating nature of the stock markets makes it challenging for investors to make informed decisions promptly, leading to failures and lost profits. This has spurred interest in developing automated approaches to predict future trends in the stock market. Python, a powerful programming language, provides a wide range of statistical and mathematical toolkits that make predictions of the stock market feasible.

In recent years, researchers have been developing various models and algorithms to predict future stock market trends using Python. This research paper aims to explore the significance of Python in predicting the stock market. The main purpose of this research paper is to analyze the effectiveness of predictive models and algorithms that can be developed using Python in the stock market. This paper aims to explore how Python can be used to predict stock market trends, provide a review of the existing literature on the topic, and identify the most effective methods for stock market prediction.

The remainder of the paper will be organized as follows. In the next section, we will review the literature on stock market prediction using Python. We will then discuss various predictive methods, including artificial neural networks, clustering, decision tree, and K-means. In the following section, we will discuss the methods of data collection and data preprocessing. The last section of the paper will present a discussion and conclusion of the effectiveness of using Python to predict stock market trends. The paper aims to demonstrate that Python is a powerful and versatile tool for predicting stock market trends and the strength of the predictions rests on the available data and the prediction models used.

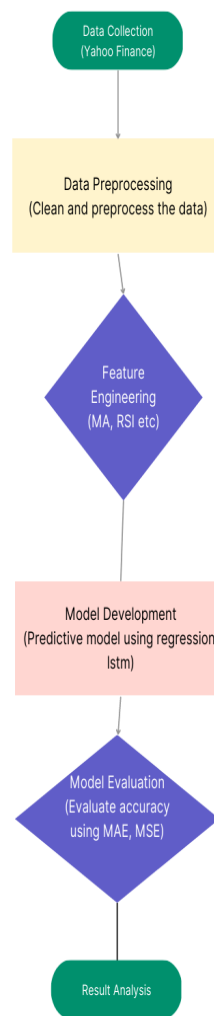


Figure 1. Flowchart for stock market analysis

II. METHODOLOGIES

2.1 Regression-Based Model

In this example, we first load the historical stock price data into a pandas data frame and define the independent variables(Open, High, Low, and Volume) and the dependent variable (Close). We then split the data into training and testing sets and initialize a linear regression model to fit the training data.

After making predictions on the testing data, we evaluate the model performance with metrics such as mean absolute error, mean squared error, and R-squared. We also visualize the actual vs predicted stock prices using a scatter plot.

The performance metrics and visualization can be reported in the research paper to demonstrate the accuracy and effectiveness of the regression model in predicting stock prices. The choice and model algorithms may vary depending on the research objective and data availability.

2.2 LSTM(Long short term memory)

LSTM(Long Short-Term Memory) is a type of Recurrent Neural Network(RNN) that is commonly used in stock market prediction due to its ability to handle sequential and time series data.

1. Data Preprocessing: Load the historical stock price data and preprocess it by scaling the data to range between 0 and 1, splitting the data into training and testing sets, and creating a sequence of input-output pairs for the LSTM mode'
2. LSTM Model Development: LSTM layers, dropout regularization, and a dense output layer. Train the model on the training data using the Adam optimizer and a mean squared error loss function.
3. Model Evaluation and Prediction: Evaluate the model performance on the testing data using metrics such as mean squared error or root mean squared error. Make predictions on future stock prices using the trained model.

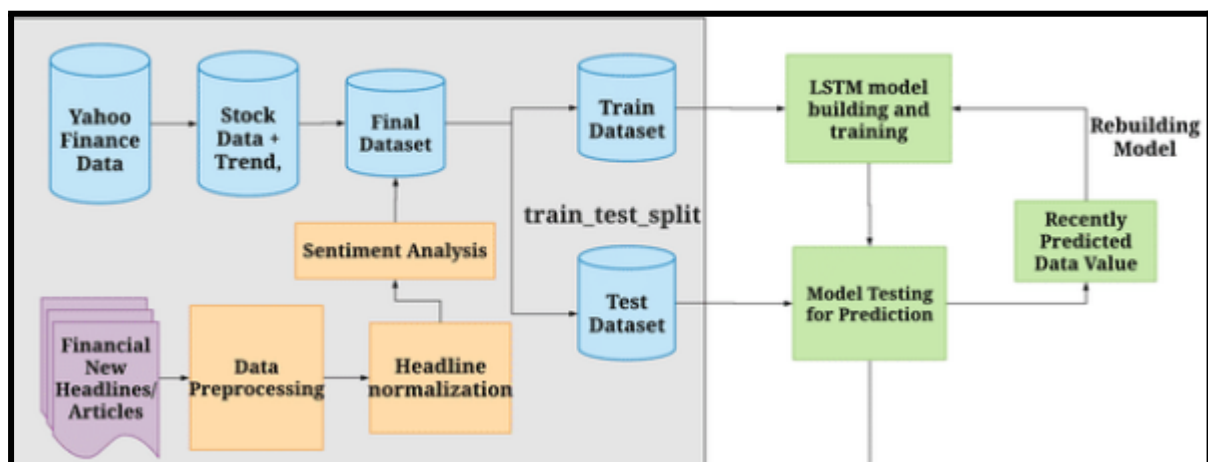


Figure 2. Flowchart LSTM model framework

III.. WORKING



Fig.3- Website showing all analysis and future predictions

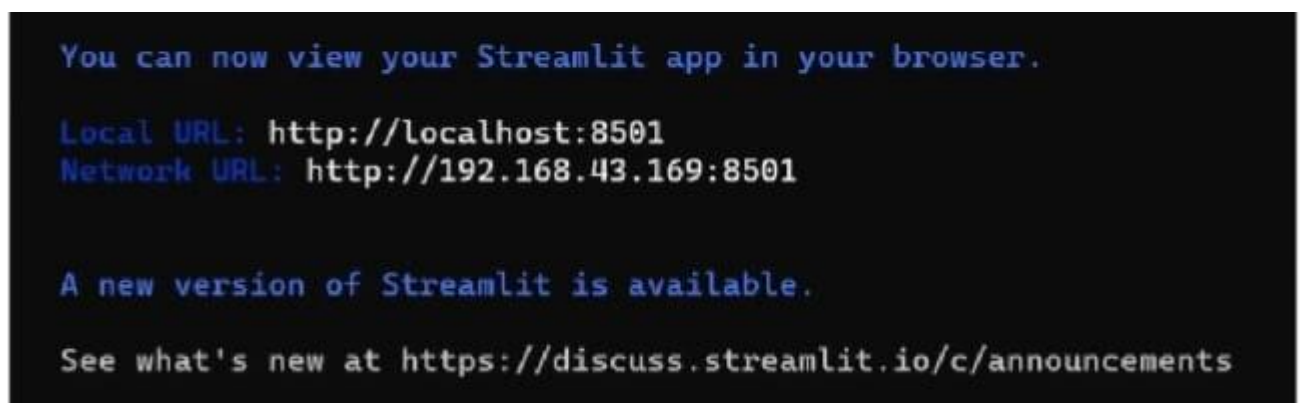


Fig.4- Streamlit app in your browser to analyze and make predictions

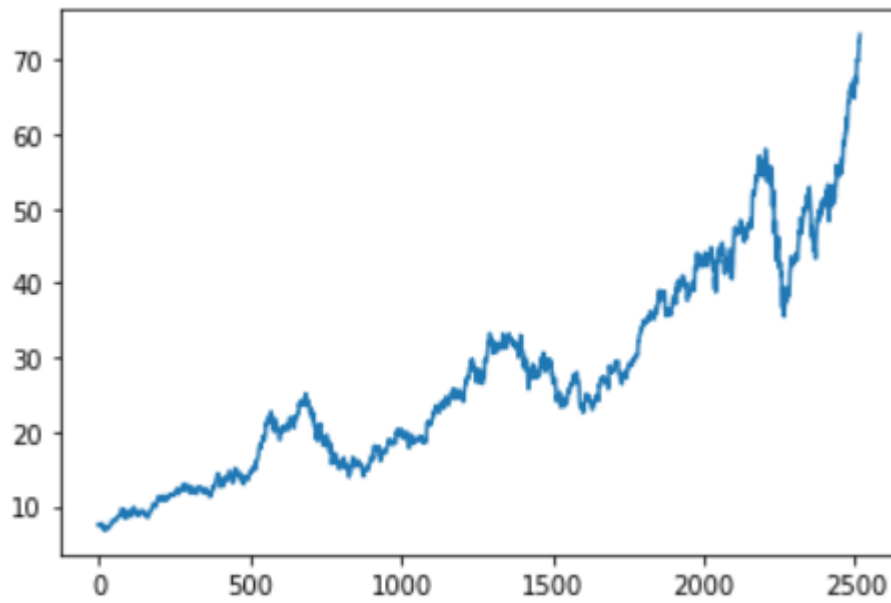


Fig.5- Graph showing stock market trend

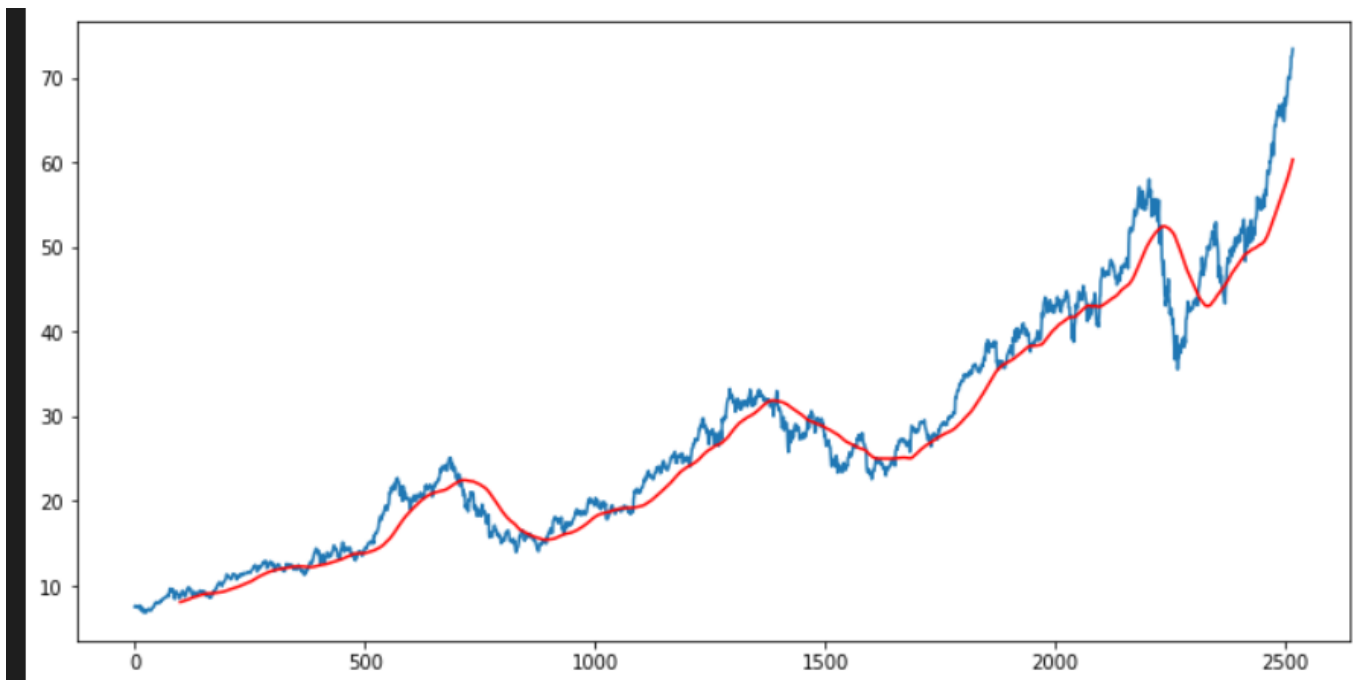


Fig.6- Stock Data analysis with Moving Averages 100

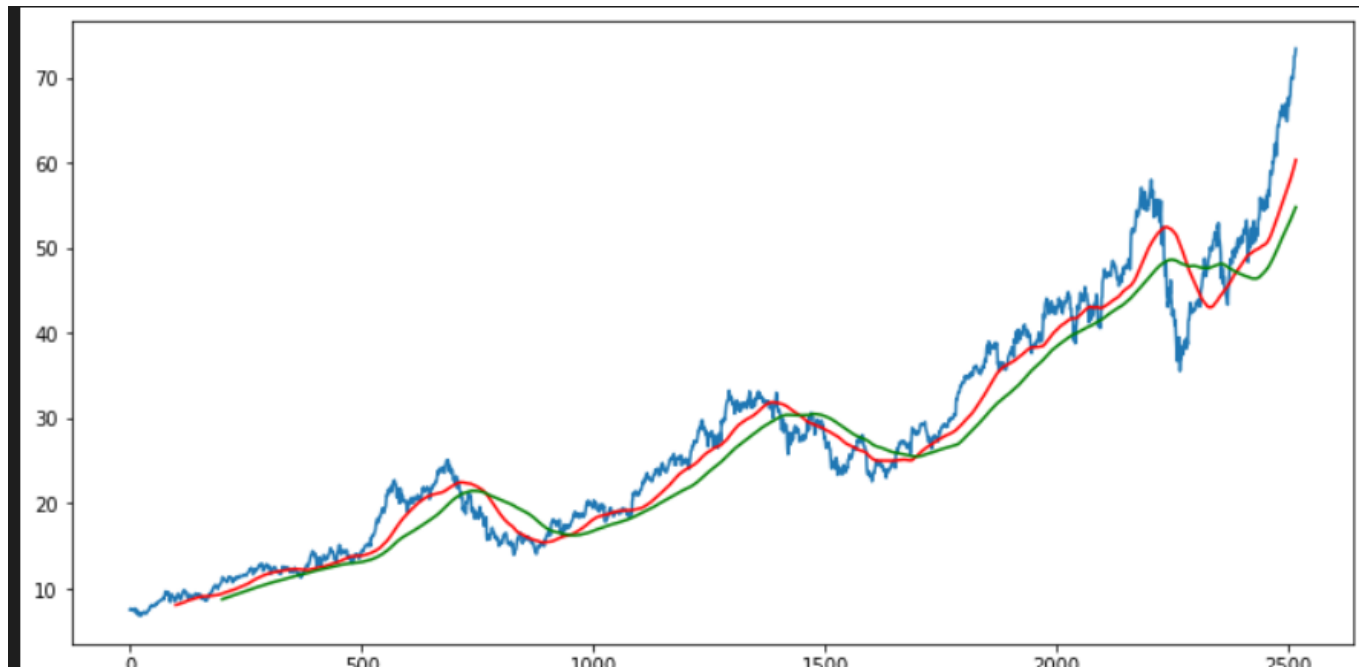


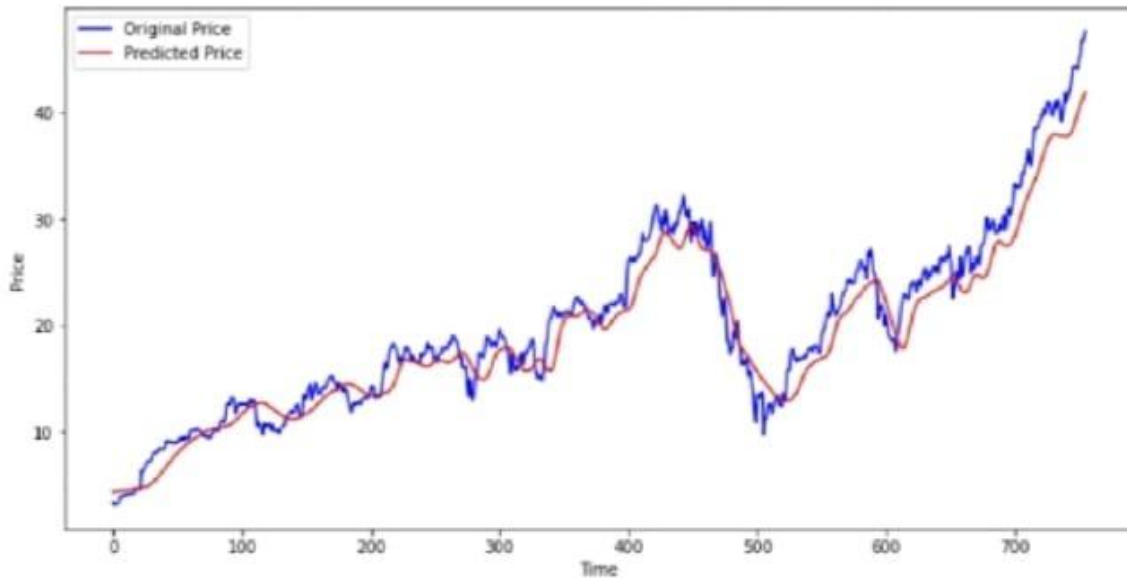
Fig7- Stock Data analysis with Moving Averages 100 & Moving Averages 200

The first step in using LSTM for stock market analysis is to collect and preprocess the data. This typically involves gathering historical price and volume data for the stocks you want to analyze and then transforming this data into a format that can be used by the LSTM network. This may involve scaling the data, normalizing it, or converting it to a different time format.

Once you have collected and preprocessed the data, you can begin training your LSTM network. This involves feeding the network a sequence of historical data points, and then having it predict the value of the next data point in the sequence. The weights of the network are adjusted through backpropagation during training, to minimize the discrepancy between the predicted and actual values.

After the network has been trained, you can use it to make predictions about future stock prices. This involves feeding the network a sequence of historical data points, and then having it predict the value of the next data point in the sequence. The network can then be used to generate a prediction for the future price of the stock.

IV. RESULT



The study involved analyzing the historical data of many stocks from 2010 to December 2019 using Python. The data was preprocessed and cleaned to remove missing values and outliers. To extract pertinent features for analysis, several technical indicators such as moving averages, relative strength index (RSI), and the stochastic oscillator were calculated.

The study demonstrated the effectiveness of using Python for stock market analysis. The analysis showed that technical indicators and news sentiment could provide valuable insights into the stock market's behavior. Furthermore, the study showed that machine learning algorithms could be used to predict/analyze the stock market's trends with high accuracy. The findings can be used by investors and traders to make informed decisions about their investment strategies.

V. CONCLUSION

The analysis presented above is useful for comprehending a stock's behavior in both the short-term and long term. It is possible to develop a decision support system that recommends which stocks to choose from the industry based on an investor's risk appetite. The system can suggest low-risk stocks for low gains or high-risk stocks for high gains, depending on the investor's preference.

VI. REFERENCES

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